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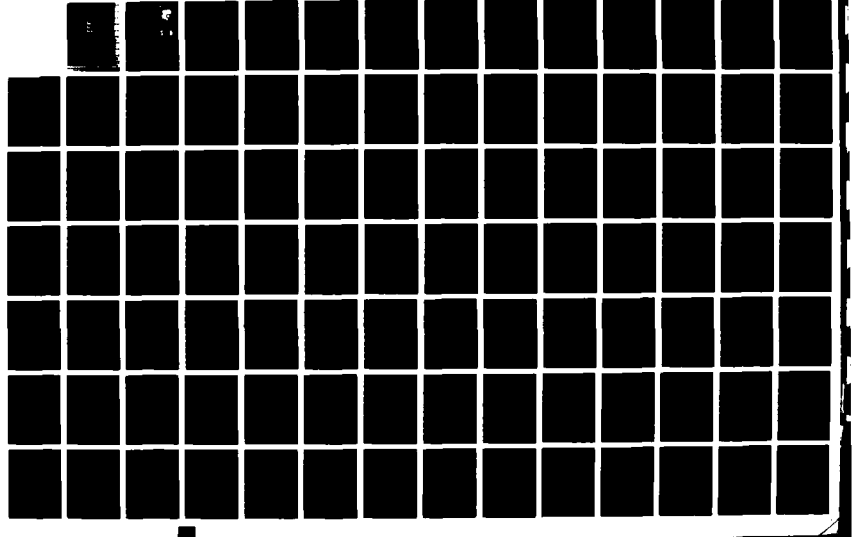

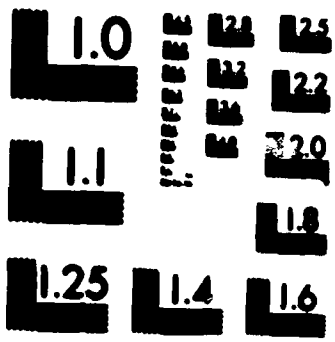

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AFWAL-TR-86-4006
Volume V
Part 10

INTEGRATED INFORMATION SUPPORT SYSTEM (IISS)
Volume V - Common Data Model Subsystem
Part 10 - NDML Precompiler Control Module Product Specification

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General Electric Company
Production Resources Consulting
One River Road
Schenectady, New York 12345

Final Report for Period 22 September 1980 - 31 July 1985

November 1985

Approved for public release; distribution is unlimited.

PREPARED FOR:

MATERIALS LABORATORY
AIR FORCE WRIGHT AERONAUTICAL LABORATORIES
AIR FORCE SYSTEMS COMMAND
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87 7 2 040

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This technical report has been reviewed and is approved for publication.

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5 Aug 1986
DATE

FOR THE COMMANDER:

GERALD C. SHUMAKER, BRANCH CHIEF
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7 Aug 86
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19. ABSTRACT (Continue on reverse if necessary and identify by block number):

This document is the product specification establishing the design implementation of the IISS Configuration Item PREO which will control other components of the Neutral Data Manipulation Language (NDML) precompiler.

→ See p I-1

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PREFACE

This product specification covers the work performed under Air Force Contract F33615-80-C-5155 (ICAM Project 6201). This contract is sponsored by the Materials Laboratory, Air Force Systems Command, Wright-Patterson Air Force Base, Ohio. It was administered under the technical direction of Mr. Gerald C. Shumaker, ICAM Program Manager, Manufacturing Technology Division, through Project Manager, Mr. David Judson. The Prime Contractor was Production Resources Consulting of the General Electric Company, Schenectady, New York, under the direction of Mr. Alan Rubenstein. The General Electric Project Manager was Mr. Myron Hurlbut of Industrial Automation Systems Department, Albany, New York.

Certain work aimed at improving Test Bed Technology has been performed by other contracts with Project 6201 performing integrating functions. This work consisted of enhancements to Test Bed software and establishment and operation of Test Bed hardware and communications for developers and other users. Documentation relating to the Test Bed from all of these contractors and projects have been integrated under Project 6201 for publication and treatment as an integrated set of documents. The particular contributors to each document are noted on the Report Documentation Page (DD1473). A listing and description of the entire project documentation system and how they are related is contained in document FTR620100001, Project Overview.

The subcontractors and their contributing activities were as follows:

TASK 4.2

Subcontractors	Role
Boeing Military Aircraft Company (BMAC)	Reviewer
D. Appleton Company (DACOM)	Responsible for IDEF support, state-of-the-art literature search
General Dynamics/ Ft. Worth	Responsible for factory view function and information models

Subcontractors	Role
Illinois Institute of Technology	Responsible for factory view function research (IITRI) and information models of small and medium-size business
North American Rockwell	Reviewer
Northrop Corporation	Responsible for factory view function and information models
Pritsker and Associates	Responsible for IDEF2 support
SofTech	Responsible for IDEF0 support

TASKS 4.3 - 4.9 (TEST BED)

Subcontractors	Role
Boeing Military Aircraft Company (BMAC)	Responsible for consultation on applications of the technology and on IBM computer technology.
Computer Technology Associates (CTA)	Assisted in the areas of communications systems, system design and integration methodology, and design of the Network Transaction Manager.
Control Data Corporation (CDC)	Responsible for the Common Data Model (CDM) implementation and part of the CDM design (shared with DACOM).
D. Appleton Company (DACOM)	Responsible for the overall CDM Subsystem design integration and test plan, as well as part of the design of the CDM (shared with CDC). DACOM also developed the Integration Methodology and did the schema mappings for the Application Subsystems.

Subcontractors	Role
Digital Equipment Corporation (DEC)	Consulting and support of the performance testing and on DEC software and computer systems operation.
McDonnell Douglas Automation Company (McAuto)	Responsible for the support and enhancements to the Network Transaction Manager Subsystem during 1984/1985 period.
On-Line Software International (OSI)	Responsible for programming the Communications Subsystem on the IBM and for consulting on the IBM.
Rath and Strong Systems Products (RSSP) (In 1985 became McCormack & Dodge)	Responsible for assistance in the implementation and use of the MRP II package (PIOS) that they supplied.
SofTech, Inc.	Responsible for the design and implementation of the Network Transaction Manager (NTM) in 1981/1984 period.
Software Performance Engineering (SPE)	Responsible for directing the work on performance evaluation and analysis.
Structural Dynamics Research Corporation (SDRC)	Responsible for the User Interface and Virtual Terminal Interface Subsystems.

Prime contractors under other projects who have contributed to Test Bed Technology, their contributing activities and responsible projects are as follows:

Contractors	ICAM Project	Contributing Activities
Boeing Military Aircraft Company (BMAC)	1701, 2201, 2202	Enhancements for IBM node use. Technology Transfer to Integrated Sheet Metal Center (ISMC)

Contractors	ICAM Project	Contributing Activities
Control Data Corporation (CDC)	1502, 1701	IISS enhancements to Common Data Model Processor (CDMP)
D. Appleton Company (DACOM)	1502	IISS enhancements to Integration Methodology
General Electric	1502	Operation of the Test Bed and communications equipment.
Hughes Aircraft Company (HAC)	1701	Test Bed enhancements
Structural Dynamics Research Corporation (SDRC)	1502, 1701, 1703	IISS enhancements to User Interface/Virtual Terminal Interface (UI/VTI)
Systran	1502	Test Bed enhancements. Operation of Test Bed.

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LIST OF ILLUSTRATIONS

SECTION 1

SCOPE

1.1 Identification

This specification establishes the design of a number of software modules necessary for the precompiler that were not addressed in any of the NDML Precompiler Development Specification. They can be referred to as PREO, "NDML Control Modules", to be built and formally accepted by the ICAM Program Office. This CI constitutes one of the subsystems of the Common Data Model Processor (CDMP).

1.2 Functional Summary

This configuration item consists of the following software modules:

1. CDM01, APNAME
2. MAIN, CDPRE
3. CDECHK
4. RPTERR
5. CDP13

The purpose of Computer Program Configuration Item (CPCI) and a brief description of the major functions follows:

1. CDM01 is designated to be a queue server process that accesses an ORACLE database. It is accessed by a call to the module APNAME. It determines the next available name to use for a software module that is to be generated. It is also accessed by a call to module RUMOD to signal reuse of a software module during error recovery.

2. MAIN and CDPRE are designed to be the user interface entry point and top level NDML precompiler control module respectively. At this time, the user interface is the NDML precompiler and is designed to be a simple batch-oriented COBOL program. The inputs to the precompiler are "ACCEPTED" from a single file and the

outputs (the identification of generated code) are "DISPLAY" output. This user interface main, after having assembled the input, then calls CDPRE. CDPRE is the callable entry point to the precompiler itself. The precompiler has been made a callable routine to support many other user interfaces as yet unbuilt. CDPRE is essentially a control routine of other designed CPCI's of the NDML precompiler. It executes a loop while over the user input file. This allows for many user modules of a single logical unit of work to be precompiled at the same time (a requirement of the current design). After each user module is precompiled, CDECHK is called to perform any error handling chores. At the end of the user's batch, CDP14 (PRE14) is accessed to generate the necessary request processor main routines.

3. CDECHK is a module that localizes all error checking and handling for the precompilation of a single user module. If the precompile was successful, a record of all generated code is stored on the CDM ORACLE database. If unsuccessful, all module names assigned and generated during the precompilation process must be marked as re-useable.

4. A generalized routine, RPTERR, is used to report user errors during precompilation. This writes the specific message into an error file that contains all user input code along with the interspersed error messages in much the same way as a standard COBOL compiler.

5. CDP13 is a module designed to control all code generation activities of the precompiler. It is called by PRE5. Input to CDP13 consists of the logical specifications for each subtransaction to be generated. For each subtransaction, APNAME is called to get a new name for the module to be generated for a query, PRE8 is called to generate the CS to ES transformer. PRE10 is called to generate code into the user's AP. Also, one of the DBMS specific code generator's is called based upon the type of DBMS the subtransaction must access.

SECTION 2

DOCUMENTS

2.1 Reference Documents

1. ICAM Documentation Standards: IDS15012000A, 28 December 1981.

2. D. Appleton Co., CDM Administrators Manual: UM620141000, March 1984.

3. D. Appleton Co., CDM1-IDEF1 Model of the Common Data Model; CCS620141000, 15 May 1985.

4. D. Appleton Co., Computer Program Development Specification (DS) for ICAM Integrated Support System (IISS) Configuration Item: NDML Precompiler; DS620141200, October 1984.

5. D. Appleton Co., Embedded NDML Programmer's Reference Manual; PRM620141200, March 1985.

6. Softech, Inc., NTM Programmer's Guide: UM620140001, July 1984.

7. Control Data Corp., Computer Program Development Specification (DS) for ICAM Integrated Support System (IISS) Configuration Item: NDDL Command Processor; DS620141100, June 1985.

2.2 Terms and Abbreviations

Attribute Use Class: (AUC)

Conceptual Schema: (CS)

Common Data Model Processor: (CDMP)

Common Data Model: (CDM) Describes common data application process formats, form definitions, etc, of the IISS and includes conceptual schema, external, internal schemas, and schema transformation operators.

Data Field: (DF) An element of data in the external schema. It

is by this name that an NDML programmer references data.

Database Management System: (DBMS)

Distributed Request Supervisor: (DRS) This IISS CDM subsystem configuration item controls the execution of distributed NDML queries and non distributed updates.

Domain: A logical definition of legal attribute class values.

Domain Constraint: Predicate that applies to a single domain.

External Schema: (ES)

Forms: Structured views which may be imposed on windows or other forms. A form is composed of fields where each field is a form, item, or window.

Forms Processor: (FP) A set of callable execution time routines available to an application program for form processing.

Internal Schema: (IS)

Integrated Information Support System: (IISS) A test computing environment used to investigate, demonstrate and test the concepts of information management and information integration in the context of Aerospace Manufacturing. The IISS addresses the problems of integration of data resident on heterogeneous databases supported by heterogeneous computers interconnected via a local Area Network.

Mapping: The correspondence of independent objects in two schemas: ES to CS or CS to IS.

Network Transaction Manager: (NTM) Performs the coordination, communication and housekeeping functions required to integrate the application processes and system services resident on the various hosts into a cohesive system.

Neutral Data Manipulation Language: (NDML) A language developed by the IISS project to provide uniform access to common data, regardless of database manager or distribution criteria. It provides distributed retrieved and single node updates.

ORACLE: Relational DBMS based on the SQL (Structured Query Language, a product of ORACLE Corp, Menlo Park, CA). The CDM is an ORACLE database.

Parcel: A sequential file containing sections source code of the input application program.

Request Processor: (RP) A COBOL program that will satisfy a retrieval or update NDML subtransaction against a particular Database Management System.

User Interface: (UI) Controls the user's terminal and interfaces with the rest of the system.

Virtual Terminal Interface: (VTI) Performs the interfacing between different terminals and the UI. This is done by defining a specific set of terminal features and protocols which must be supported by UI software which constitutes the Virtual Terminal Definition. Specific terminals are then mapped against the Virtual Terminal software by specific software modules written for each type of real terminal supported.

SECTION 3

REQUIREMENTS

3.1 Structural Description

A graphic portrayal of this CPCI is included in Section 3.10. This chart shows the hierarchical relationship of each module making up this CPCI. Since only those modules of this CPCI are shown in Section 3.10, the user is referred to the diagrams of Section 3.3 to show how these modules control the CPCI's of the NDML precompiler.

3.2 Functional Flow

A single execution of the NDML precompiler may have many logical units of work, each consisting of a batch of user modules. MAIN controls this loop. Each batch consists of many user modules which may be precompiled successfully or unsuccessfully. This loop is controlled by CDPRE. Error handling logic, for each user module, is controlled by CDECHK. Many NDML statements may be found in each user module. This logic is controlled by PRE2. Each NDML statement may require many conceptual transactions (the original request plus any integrity tests) which is controlled by PRE4. Each conceptual transaction may require many internal schema subtransactions. This is determined by PRE5. The generation of code for each subtransaction is controlled by CDP13.

3.3 Interfaces

Figure 3-1 depicts the interface of PRE0 with other CPCI's in the system.

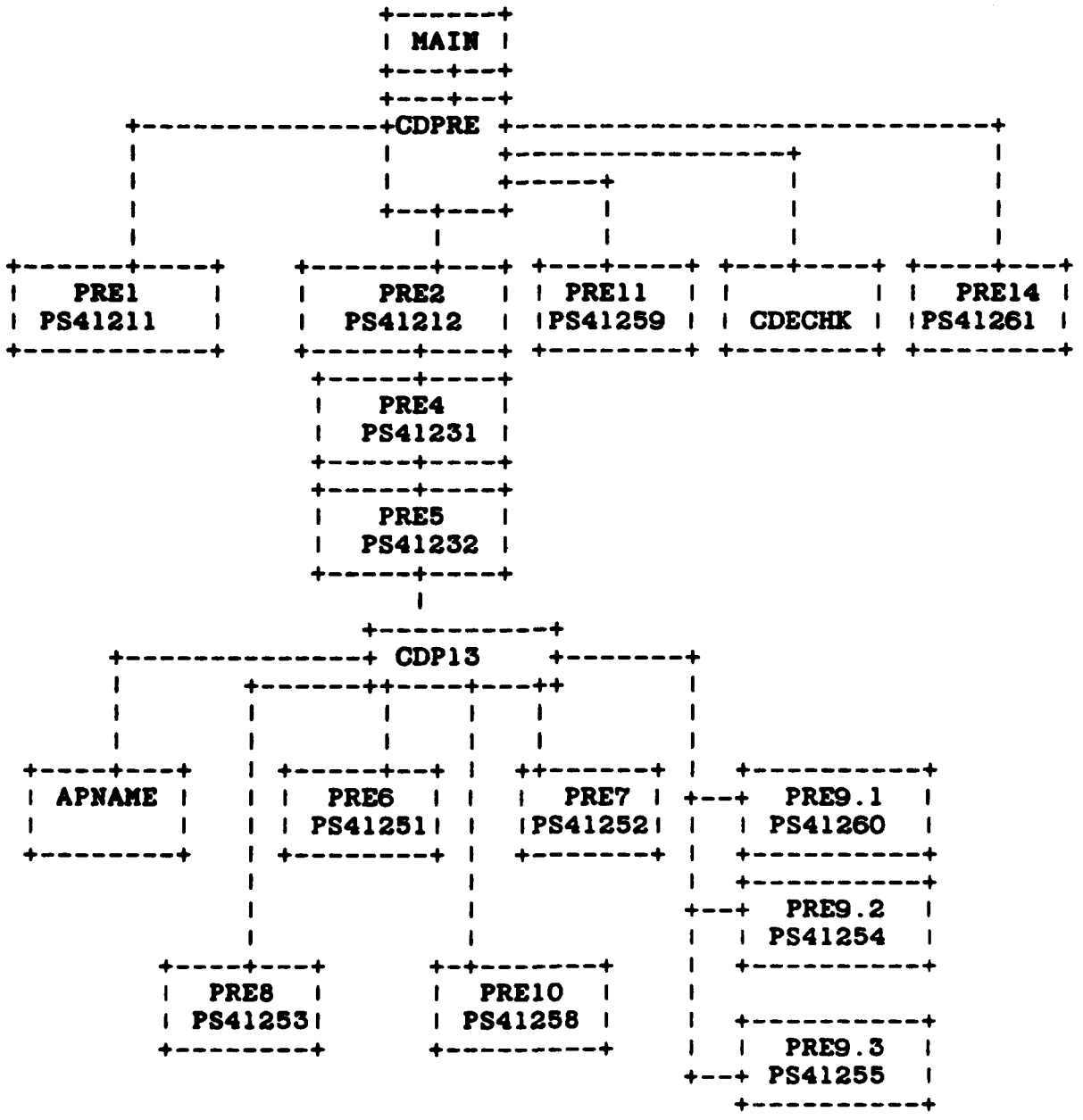

Figure 3-1. Interface of PRE0 with Other CPCI's

3.3.1 Inputs/Outputs

The following tables depict the inputs and outputs of each module in this CPCI. A detailed description for each item can be found in the DS for this CPCI.

MODULE: CDM01

INPUT	OUTPUT
--NONE--	

MODULE: APNAME

INPUT	OUTPUT
DBMS Name	Application Process Name Module Status

MODULE: CDPRE

INPUT	OUTPUT
Application Process Input File Error File	Code Generator Table Number of Good Precompiles
Application Process Target Host	Number of Bad Precompiles
Users Application Process Name	Module Status

MODULE: CDECHK

INPUT	OUTPUT
Precompile Status Last Module Used Users Module Name Current Host Target Host Parcel 1 Parcel 2 Parcel 3	Module Status

Parcel 4
Source Language
Code Generator
Oracle Logon Data Area

3.4 Program Interrupts

Not applicable to this CPCI.

3.5 Timing and Sequencing Description

Not applicable to this CPCI.

3.6 Special Control Features

Not applicable to this CPCI.

3.7 Storage Allocation

3.7.1 Database Definition

The database used by this CPCI is the Common Data Model (CDM) database. This model is defined by the CDM1, the IDEF1 model of the CDM, Reference Number 3.

3.7.1.1 File Description

No permanent files have been defined for this CPCI. It may use temporary scratch files for such things as generated program source code or temporary query results.

3.7.1.2 Table Description

Not applicable to this CPCI.

3.7.1.3 Item Description

Not applicable to this CPCI.

3.8 Object Code Creation

The object code for this CPCI will be created by the system integration test team by using defined IISS Software Configuration Management Procedures. This CPCI will use the COBOL language compiler.

3.9 Adaptation Data

This CPCI has been coded using ANSI COBOL. The intent was to provide a transportable system. Any system environment supporting this language, a virtual memory management scheme, the COMM and NTM subsystem of IISS and the ORACLE Database Management System should be able to support this CPCI. Every possible attempt has been made to localize and identify any machine or environment dependent modules through the original design of the IISS and application of Configuration Management Procedures.

3.10 Detail Design Description

The following sections have been computer generated for this CPCI.

3.10.1 Main Program List

The following is a list of all "Main Programs" which are modules that are not called by any other module being documented here. These modules are either program entry points or, if they are hooked into another set of programs via subroutine calls, they are the points the external programs can call and therefore enter through. To differentiate between the two types of entry points, look at the individual Module Documentation (section 3.10.8) and look at Module Type for each of the Main Program modules listed. Note whether the routine is a Program, Subroutine, or Function. If it is a Program, it is truly a main program entry point. If not, then it is merely called by other programs not being documented here.

PRECOMPILER CONTROL Main Program List

Module Name	Purpose
CDM01	CONTROLS ALL REQUESTS FOR MODULE NAMES
CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
MAIN	PROGRAM NAME NDML MAIN AND UI
OPNFIL	THIS ROUTINE OPENS AN OUTPUT FILE.
STRMOV	MOVE THE STRING TO THE POOL
SUBMOV	FACILITATE A SUB-STRING MOVE

3.10.2 Module List

The following is a list of all the modules being documented here along with their purpose. Each module has a unique name, no matter what language it was written in.

PRECOMPILER CONTROL Module List

Module Name	Purpose
APNAME	INTERFACES WITH THE MODULE NAME QUEUE SERVER
CDDGAP	DELETE GENERATED AP ROWS IN THE GAP TABLES IN THE CDM
CDECHK	PROVIDE PRECOMPILER ERROR CHECKING
CDIGAP	CDIGAP INSERTS A ROW IN THE GENERATED AP TABLE.
CDM01	CONTROLS ALL REQUESTS FOR MODULE NAMES
CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
CDPRE	CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER
MAIN	PROGRAM NAME NDML MAIN AND UI
OPNFIL	THIS ROUTINE OPENS AN OUTPUT FILE.
RCMOD	MARK PREVIOUSLY ASSIGNED MODULES AS REUSABLE
RPTERR	OUTPUT PRECOMPILER ERROR MESSAGES TO AP LISTING
RUMOD	SIGNAL REUSE OF A MODULE
STRMOV	MOVE THE STRING TO THE POOL
SUBMOV	FACILITATE A SUB-STRING MOVE

3.10.3 External Routines List

The following is a list of all routines or functions not documented here that are called by modules that are documented here. The first caller, in alphabetical order, is listed as well. The specification in which any module is documented may be found in the Module Documentation Index (Document Number CM 620100001). See section 3.10.6 for a list of the modules that call each of these external routines.

PRECOMPILER CONTROL External Routines List

Module Name	First User
CDFUNC	APNAME
CDP10	CDP13
CDP12	CDPRE
CDP14	CDPRE
CDPRE1	CDPRE
CDPRE2	CDPRE
CDPRE7	CDP13
CDPRE8	CDP13
CDPRE9	CDP13
CDQPC	CDP13
CDQPO	CDP13
CDQPT	CDP13
CLSERR	CDPRE
DELFIL	CDECHK
ERRPRO	APNAME
FOPEN	OPNFIL
INITAL	CDMO1
INITEX	MAIN
NSEND	APNAME
OBINDN	CDIGAP
OCLOSE	CDIGAP
OCOM	CDMO1
ODFINN	CDMO1
OEXEC	CDDGAP
OFETCH	CDMO1
OLOGOF	CDMO1
OLON	CDPRE
OOPEN	CDDGAP
OPNERR	CDPRE
OPNINPT	CDPRE
OROL	CDPRE
OSQL3	CDDGAP
PRINTF	OPNFIL
QSEND	CDMO1
RCV	CDMO1
REDINPT	CDPRE
TRMNAT	CDMO1
UNPLINE	CDPRE
WRITERR	CDPRE

3.10.4 Include File List

The following is a list of all include files called in by modules being documented here. Each include file has a unique name regardless of the language being used. The purpose of each include file is listed as well. A more complete description of each include file is given in section 3.10.9. The purpose listed is the one that is in the source code of the include file.

A purpose of "**** PURPOSE NOT FOUND BY STRIPPER ****" indicates that a purpose statement was not written into the include file itself. The most common reason for this is that the include file comes from system libraries that were not developed by the project, such as 'C' libraries that are provided with the 'C' compiler.

See section 3.10.6 for a set of lists which show all the modules which call in each of these include files.

PRECOMPILER CONTROL Include File List

File Name	Purpose
ALFABET	LETTERS CONTAINED IN THE ENGLISH ALPHABET
APAT	ACCESS PATH TABLE
APGC	GENERIC CODASYL COMMAND TABLE
APINFO	ACCESS PATH INFORMATION TABLE
APL	JOIN QUERY ATTRIBUTE PAIR LIST
APRK	TABLE OF RECORD KEYS FOR CODASYL ACCESS PATHS
CEWORK	CS TO ES WORK LIST INFORMATION
CGTABLE	CODE GENERATING TABLE- TRACKS ALL GENERATED SOFTWARE
CHKCDM	IISS CDMP CHECK STATUS CODES
CSAL	CONCEPTUAL SCHEMA ACTION LIST
CSQUAL	CONCEPTUAL SCHEMA QUALIFY LIST
ERRCDM	IISS ERROR STATUS CODES FOR CDMP MODULES
ERRPRO	PROCESS ERROR INCLUDE FILE
ESAL	EXTERNAL SCHEMA ACTION LIST
ESQUAL	EXTERNAL SCHEMA QUALIFY LIST
FILSTAT	VARIABLE DEFINITION FOR FILE STATUS
ISAL	INTERNAL SCHEMA ACTION LIST
ISQUAL	INTERNAL SCHEMA QUALIFY LIST
JQGTBL	JOIN QUERY GRAPH TELLS HOW TO CONNECT SUBTRANSACTIONS
ORCLEDA	WS DEFINITION FOR THE ORACLE LOGIN AREA
RFTABLE	THE RESULT FIELD TABLE
SETTAB	LIST OF SETS OWNER-MEMBER RELATIONSHIPS
SRVRET	AS THE RETURN GIVEN A TABLE-FULL ERROR
STDIO	**** PURPOSE NOT FOUND BY STRIPPER ****
SUBPROC	SUBTRANSACTION PROCESSES ID TABLE
UVABBR	USER VIEW ABBREVIATION LIST

3.10.5 Where Include File Used List

The following lists each include file from 3.10.4 and all the modules documented in this specification which include them. The purpose of each module is listed as well.

PRECOMPILER CONTROL Where-include-file-used List

Include File	Module Name	Module Purpose
ALFABET	CDM01	CONTROLS ALL REQUESTS FOR MODULE NAMES
APAT	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
APGC	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
APINFO	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
APL	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
APRK	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
CEWORK	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION

PRECOMPILER CONTROL Where-include-file-used List

Include File	Module Name	Module Purpose
CGTABLE		
	CDECHK	PROVIDE PRECOMPILER ERROR CHECKING
	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
	CDPRE	CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER
	MAIN	PROGRAM NAME NDML MAIN AND UI
CHKCDM		
	APNAME	INTERFACES WITH THE MODULE NAME QUEUE SERVER
	CDDGAP	DELETE GENERATED AP ROWS IN THE GAP TABLES IN THE CDM
	CDECHK	PROVIDE PRECOMPILER ERROR CHECKING
	CDIGAP	CDIGAP INSERTS A ROW IN THE GENERATED AP TABLE.
	CDM01	CONTROLS ALL REQUESTS FOR MODULE NAMES
	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
	CDPRE	CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER
	MAIN	PROGRAM NAME NDML MAIN AND UI
	RCMOD	MARK PREVIOUSLY ASSIGNED MODULES AS REUSABLE
	RUMOD	SIGNAL REUSE OF A MODULE
CSAL		
	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION

PRECOMPILER CONTROL Where-include-file-used List

Include File	Module Name	Module Purpose
CSQUAL		
	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
ERRCDM		
	APNAME	INTERFACES WITH THE MODULE NAME QUEUE SERVER
	CDDGAP	DELETE GENERATED AP ROWS IN THE GAP TABLES IN THE CDM
	CDECHK	PROVIDE PRECOMPILER ERROR CHECKING
	CDIGAP	CDIGAP INSERTS A ROW IN THE GENERATED AP TABLE.
	CDM01	CONTROLS ALL REQUESTS FOR MODULE NAMES
	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
	CDPRE	CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER
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	RUMOD	SIGNAL REUSE OF A MODULE
ERRPRO		
	APNAME	INTERFACES WITH THE MODULE NAME QUEUE SERVER
	CDDGAP	DELETE GENERATED AP ROWS IN THE GAP TABLES IN THE CDM
	CDECHK	PROVIDE PRECOMPILER ERROR CHECKING
	CDIGAP	CDIGAP INSERTS A ROW IN THE GENERATED AP TABLE.
	CDM01	CONTROLS ALL REQUESTS FOR MODULE NAMES
	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
	CDPRE	CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER
	MAIN	PROGRAM NAME NDML MAIN AND UI

PRECOMPILER CONTROL Where-include-file-used List

Include File	Module Name	Module Purpose
	RCMOD	MARK PREVIOUSLY ASSIGNED MODULES AS REUSABLE
	RPTERR	OUTPUT PRECOMPILER ERROR MESSAGES TO AP LISTING
	RUMOD	SIGNAL REUSE OF A MODULE
ESAL		
	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
ESQUAL		
	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
FILSTAT		
	MAIN	PROGRAM NAME NDML MAIN AND UI
	RPTERR	OUTPUT PRECOMPILER ERROR MESSAGES TO AP LISTING
ISAL		
	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
ISQUAL		
	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION

PRECOMPILER CONTROL Where-include-file-used List

Include File	Module Name	Module Purpose
JQGTBL		
	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
ORCLEDA		
	CDDGAP	DELETE GENERATED AP ROWS IN THE GAP TABLES IN THE CDM
	CDECHK	PROVIDE PRECOMPILER ERROR CHECKING
	CDIGAP	CDIGAP INSERTS A ROW IN THE GENERATED AP TABLE.
	CDM01	CONTROLS ALL REQUESTS FOR MODULE NAMES
	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
	CDPRE	CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER
RFTABLE		
	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
SETTAB		
	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
SRVRET		
	APNAME	INTERFACES WITH THE MODULE NAME QUEUE SERVER
	CDM01	CONTROLS ALL REQUESTS FOR MODULE NAMES

PRECOMPILER CONTROL Where-include-file-used List

Include File	Module Name	Module Purpose
	CDPRE	CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER
	MAIN	PROGRAM NAME NDML MAIN AND UI
	RCMOD	MARK PREVIOUSLY ASSIGNED MODULES AS REUSABLE
	RUMOD	SIGNAL REUSE OF A MODULE
STDIO		
	OPNFIL	THIS ROUTINE OPENS AN OUTPUT FILE.
SUBPROC		
	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
UVABBR		
	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION

3.10.6 Where External Routine Used List

The following lists each external function or routine listed in 3.10.3 and all the documented modules which call it. The purpose of each module is listed as well.

PRECOMPILER CONTROL Where-external-routine-used List

System Module	Module Name	Module Purpose
CDFUNC		
	APNAME	INTERFACES WITH THE MODULE NAME QUEUE SERVER
	RCMOD	MARK PREVIOUSLY ASSIGNED MODULES AS REUSABLE
	RUMOD	SIGNAL REUSE OF A MODULE
CDP10		
	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
CDP12		
	CDPRE	CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER
CDP14		
	CDPRE	CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER
CDPRE1		
	CDPRE	CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER
CDPRE2		
	CDPRE	CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER
CDPRE7		
	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION

PRECOMPILER CONTROL Where-external-routine-used List

System Module	Module Name	Module Purpose
CDPRE8	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
CDPRE9	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
CDQPC	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
CDQPO	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
CDQPT	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
CLSERR	CDPRE	CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER
DELFIL	CDECHK	PROVIDE PRECOMPILER ERROR CHECKING
ERRPRO		

PRECOMPILER CONTROL Where-external-routine-used List

System Module	Module Name	Module Purpose
	APNAME	INTERFACES WITH THE MODULE NAME QUEUE SERVER
	CDDGAP	DELETE GENERATED AP ROWS IN THE GAP TABLES IN THE CDM
	CDECHK	PROVIDE PRECOMPILER ERROR CHECKING
	CDIGAP	CDIGAP INSERTS A ROW IN THE GENERATED AP TABLE.
	CDM01	CONTROLS ALL REQUESTS FOR MODULE NAMES
	CDP13	CONTROLS REQUEST PROCESSOR CODE GENERATION
	CDPRE	CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER
	MAIN	PROGRAM NAME NDML MAIN AND UI
	RCMOD	MARK PREVIOUSLY ASSIGNED MODULES AS REUSABLE
	RPTERR	OUTPUT PRECOMPILER ERROR MESSAGES TO AP LISTING
	RUMOD	SIGNAL REUSE OF A MODULE
FOPEN		
	OPNFIL	THIS ROUTINE OPENS AN OUTPUT FILE.
INITAL		
	CDM01	CONTROLS ALL REQUESTS FOR MODULE NAMES
INITEX		
	MAIN	PROGRAM NAME NDML MAIN AND UI
NSEND		
	APNAME	INTERFACES WITH THE MODULE NAME QUEUE SERVER
	RCMOD	MARK PREVIOUSLY ASSIGNED MODULES AS REUSABLE

PRECOMPILER CONTROL Where-external-routine-used List

System Module	Module Name	Module Purpose
	RUMOD	SIGNAL REUSE OF A MODULE
OBINDN		
	CDDGAP	DELETE GENERATED AP ROWS IN THE GAP TABLES IN THE CDM
	CDIGAP	CDIGAP INSERTS A ROW IN THE GENERATED AP TABLE.
	CDM01	CONTROLS ALL REQUESTS FOR MODULE NAMES
OCLOSE		
	CDDGAP	DELETE GENERATED AP ROWS IN THE GAP TABLES IN THE CDM
	CDIGAP	CDIGAP INSERTS A ROW IN THE GENERATED AP TABLE.
	CDM01	CONTROLS ALL REQUESTS FOR MODULE NAMES
OCOM		
	CDM01	CONTROLS ALL REQUESTS FOR MODULE NAMES
	CDPRE	CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER
ODFINN		
	CDM01	CONTROLS ALL REQUESTS FOR MODULE NAMES
OEXEC		
	CDDGAP	DELETE GENERATED AP ROWS IN THE GAP TABLES IN THE CDM
	CDIGAP	CDIGAP INSERTS A ROW IN THE GENERATED AP TABLE.
	CDM01	CONTROLS ALL REQUESTS FOR MODULE NAMES

PRECOMPILER CONTROL Where-external-routine-used List

System Module	Module Name	Module Purpose
OFETCH		
	CDM01	CONTROLS ALL REQUESTS FOR MODULE NAMES
OLOGOF		
	CDM01	CONTROLS ALL REQUESTS FOR MODULE NAMES
	CDPRE	CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER
OLON		
	CDM01	CONTROLS ALL REQUESTS FOR MODULE NAMES
	CDPRE	CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER
OOPEN		
	CDDGAP	DELETE GENERATED AP ROWS IN THE GAP TABLES IN THE CDM
	CDIGAP	CDIGAP INSERTS A ROW IN THE GENERATED AP TABLE.
	CDM01	CONTROLS ALL REQUESTS FOR MODULE NAMES
OPNERR		
	CDPRE	CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER
OPNINPT		
	CDPRE	CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER

PRECOMPILER CONTROL Where-external-routine-used List

System Module	Module Name	Module Purpose
OROL		
	CDPRE	CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER
OSQL3		
	CDDGAP	DELETE GENERATED AP ROWS IN THE GAP TABLES IN THE CDM
	CDIGAP	CDIGAP INSERTS A ROW IN THE GENERATED AP TABLE.
	CDM01	CONTROLS ALL REQUESTS FOR MODULE NAMES
PRINTF		
	OPNFIL	THIS ROUTINE OPENS AN OUTPUT FILE.
QSEND		
	CDM01	CONTROLS ALL REQUESTS FOR MODULE NAMES
RCV		
	APNAME	INTERFACES WITH THE MODULE NAME QUEUE SERVER
	CDM01	CONTROLS ALL REQUESTS FOR MODULE NAMES
	RCMOD	MARK PREVIOUSLY ASSIGNED MODULES AS REUSABLE
REDINPT		
	CDPRE	CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER

PRECOMPILER CONTROL Where-external-routine-used List

System Module	Module Name	Module Purpose
TRMMAT		
	CDM01	CONTROLS ALL REQUESTS FOR MODULE NAMES
	MAIN	PROGRAM NAME NDML MAIN AND UI
UNPLINE		
	CDPRE	CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER
WRITERR		
	CDPRE	CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER

3.10.7 Main Program Parts List

The following lists each Main Program listed in 3.10.1 and all the modules which are called either by that module itself or by any of the documented modules which it calls. It is possible for a non-main module to be listed more that once if it is called by multiple modules. The called modules, in this case known as program parts, are marked as to whether they are documented here. If so, the phrase "well-defined module" appears by the module name, if not it is an "external "routine". The Purpose of the Main Program module is listed as well.

PRECOMPILER CONTROL Main Program Parts List

Main Pgm Name	Module Name	Module Type
CDM01	Purpose-->	CONTROLS ALL REQUESTS FOR MODULE NAMES
	ERRPRO	External routine
	INITAL	External routine
	OBINDN	External routine
	OCLOSE	External routine
	OCOM	External routine
	ODFINN	External routine
	OEXEC	External routine
	OFETCH	External routine
	OLOGOF	External routine
	OLON	External routine
	OOPEN	External routine
	OSQL3	External routine
	QSEND	External routine
	RCV	External routine
	TRMNAT	External routine

PRECOMPILER CONTROL Main Program Parts List

Main Pgm Name	Module Name	Module Type
CDP13	Purpose-->	CONTROLS REQUEST PROCESSOR CODE GENERATION
	APNAME	Well-defined module
	CDFUNC	External routine
	CDP10	External routine
	CDPRE7	External routine
	CDPRE8	External routine
	CDPRE9	External routine
	CDQPC	External routine
	CDQPO	External routine
	CDQPT	External routine
	ERRPRO	External routine
	NSEND	External routine
	RCV	External routine
	RPTERR	Well-defined module

PRECOMPILER CONTROL Main Program Parts List

Main Pgm Name	Module Name	Module Type	
MAIN	Purpose-->	PROGRAM NAME AND UI	NDML MAIN
	CDDGAP	Well-defined module	
	CDECHK	Well-defined module	
	CDFUNC	External routine	
	CDIGAP	Well-defined module	
	CDP12	External routine	
	CDP14	External routine	
	CDPRE	Well-defined module	
	CDPRE1	External routine	
	CDPRE2	External routine	
	CLSERR	External routine	
	DELFIL	External routine	
	ERRPRO	External routine	
	INITEX	External routine	
	NSEND	External routine	
	OBINDN	External routine	
	OCLOSE	External routine	
	OCOM	External routine	
	OEXEC	External routine	
	OLOGOF	External routine	
	OLON	External routine	
	OOPEN	External routine	
	OPNERR	External routine	
	OPNINPT	External routine	
	OROL	External routine	
	OSQL3	External routine	
	RCMOD	Well-defined module	
	RCV	External routine	
	REDINPT	External routine	
	RPTERR	Well-defined module	
	RUMOD	Well-defined module	
	TRMNAT	External routine	
	UNPLINE	External routine	
	WRITERR	External routine	

PRECOMPILER CONTROL Main Program Parts List

Main Pgm Name	Module Name	Module Type
OPNFIL	Purpose-->	THIS ROUTINE OPENS AN OUTPUT FILE.
	FOPEN	External routine
	PRINTF	External routine

3.10.8 Module Documentation

The following documentation describes information which is specific to each individual module being documented in this specification as listed in section 3.10.2. It provides a compact way of getting information that would be otherwise buried within each module's source code.

The specific items in this module documentation have the following meanings:

NAME:	Name of program Module.
PURPOSE:	Purpose of Module as detailed in the source code.
LANGUAGE:	Programming language source code is written in. The choices are: VAX-11 FORTRAN C (I/S-1 Workbench 'C') VAX-11 COBOL
MODULE TYPE:	Whether a Program, Subroutine, or Function.
SOURCE FILE:	Name of Source File from file specification.
SOURCE FILE TYPE:	Source File Extension from file specification.
HOST:	Whether this is a host-dependent routine (VAX or IBM) or blank if host-independent.
SUBSYSTEM:	IISS sub-system this file resides in.
SUBDIRECTORY:	Sub-directory of that subsystem in which this file resides.
DOCUMENTATION GROUP:	Name of documentation group of which this source file is a member.
DESCRIPTION:	A description of the module as otained from the source code.

ARGUMENTS:	The arguments with which this routine is called if it is a Subroutine or a Function.
INCLUDE FILES:	A list of all the files that are included into this module as well as their purposes.
ROUTINES CALLED:	Subroutines or Functions, either documented or external, called by this module, if any.
CALLED DIRECTLY BY:	The documented routines which call this module, if any.
USED IN MAIN PROGRAM(S):	The documented Main Programs which contain this module in their parts list according to the list in section 3.10.7.

The Module Documentation is arranged alphabetically according to Module Name.

PRECOMPILER CONTROL Module Documentation

NAME: APNAME
PURPOSE: INTERFACES WITH THE MODULE NAME QUEUE SERVER
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: APNAME
SOURCE FILE TYPE: .COB
HOST:
SUBSYSTEM: CDM
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41200

DESCRIPTION:

THE PURPOSE OF THIS ROUTINE IS TO ACT AS A GENERALIZED INTERFACE TO THE MODULE NAME QUEUE SERVER. IT WILL GET NEW NAMES. MOD 2.0 STANDARDIZED ERROR HANDLING.

ARGUMENTS:

DBMS-NAME = DSPLY [X(30)]
AP-NAME = DSPLY [X(10)]
RET-STATUS = DSPLY [X(5)]

INCLUDE FILES:

SRVRET - AS THE RETURN GIVEN A TABLE-FULL ERROR
ERRCDM - IISS ERROR STATUS CODES FOR CDMP MODULES
CHKCDM - IISS CDMP CHECK STATUS CODES
ERRPRO - PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

CDFUNC
NSEND

RCV
ERRPRO

CALLED DIRECTLY BY:

CDP13 - CONTROLS REQUEST PROCESSOR CODE GENERATION

USED IN MAIN PROGRAM(S):

CDP13 - CONTROLS REQUEST PROCESSOR CODE GENERATION

PRECOMPILER CONTROL Module Documentation

NAME: CDDGAP
PURPOSE: DELETE GENERATED AP ROWS IN THE GAP TABLES IN THE CDM
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: CDDGAP
SOURCE FILE TYPE: .COB
HOST:
SUBSYSTEM: CDM
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41200

DESCRIPTION:

PERFORM SQL DELETE STATEMENT TO DELETE GENERATED AP REFERENCES
BASED ON THE NAME OF THE USER MODULE SUCEESSFULLY RE-PRECOMPILED

ARGUMENTS:

USER-MOD-ID = DSPLY [X(10)]
ORACLE-LDA = RECRD
RET-STATUS = DSPLY [X(5)]

INCLUDE FILES:

ERRCDM - IISS ERROR STATUS CODES FOR CDMP MODULES
CHKCDM - IISS CDMP CHECK STATUS CODES
ORCLEDA - WS DEFINITION FOR THE ORACLE LOGIN AREA
ERRPRO - PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

OOPEN
OSQL3
OBINDN

OEXEC
OCLOSE
ERRPRO

CALLED DIRECTLY BY:

CDECHK - PROVIDE PRECOMPILER ERROR CHECKING

USED IN MAIN PROGRAM(S):

MAIN - PROGRAM NAME NDML MAIN AND UI

PRECOMPILER CONTROL Module Documentation

NAME: CDECHK
PURPOSE: PROVIDE PRECOMPILER ERROR CHECKING
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: CDECHK
SOURCE FILE TYPE: .COB
HOST:
SUBSYSTEM: CDM
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41200

DESCRIPTION:

THIS ROUTINE WILL TEST THE RET-STATUS AT END OF PRECOMPILING ONE USER MODULE. IF GOOD THEN RCMOD WILL BE CALLED TO MARK ALL SOFTWARE MODULES PREVIOUSLY ASSOCIATED WITH THE USER ROUTINE AS INACTIVE, THE DELETE ALL OLD GENERATED AP REFERENCES AND FINALLY, INSERT ALL NEW GENERATED AP REFERENCES. IF THE PRECOMPILE WAS UNSUCCESSFUL, THEN EACH MODULE NEWLY ASSOCIATED WITH THE USER MODULE MUST BE MARKED AS AVAILABLE FOR REUSE BY CALLING RUMOD AND THE FILES CONTAINING GENERATED CODE DELETED.

ARGUMENTS:

PREC-STATUS = DSPLY [X(5)]
LAST-CGT-USED = DSPLY [S9(9)]
USER-MOD-ID = DSPLY [X(10)]
MY-HOST = DSPLY [XXX]
TARGET-HOST = DSPLY [XXX]
PARCL1 = DSPLY [X(30)]
PARCL2 = DSPLY [X(30)]
PARCL3 = DSPLY [X(30)]
PARCL4 = DSPLY [X(30)]
SOURCE-LANGUAGE = DSPLY [X(10)]
CODE-GENERATOR-TABLE = RECRD
ORACLE-LDA = RECRD
RET-STATUS = DSPLY [X(5)]

INCLUDE FILES:

ERRCDM	- IISS ERROR STATUS CODES FOR CDMP MODULES
CHKCDM	- IISS CDMP CHECK STATUS CODES
CGTABLE	- CODE GENERATING TABLE- TRACKS ALL GENERATED SOFTWARE
ORCLEDA	- WS DEFINITION FOR THE ORACLE LOGIN AREA
ERRPRO	- PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

ERRPRO	
RCMOD	- MARK PREVIOUSLY ASSIGNED MODULES AS REUSABLE
CDDGAP	- DELETE GENERATED AP ROWS IN THE GAP TABLES IN THE CDM
CDIGAP	- CDIGAP INSERTS A ROW IN THE GENERATED AP TABLE.
DELFIL	
RUMOD	- SIGNAL REUSE OF A MODULE

CALLED DIRECTLY BY:

CDPRE	- CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER

USED IN MAIN PROGRAM(S):

MAIN	- PROGRAM NAME NDML MAIN AND UI

PRECOMPILER CONTROL Module Documentation

NAME: CDIGAP
PURPOSE: CDIGAP INSERTS A ROW IN THE GENERATED AP TABLE.
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: CDIGAP
SOURCE FILE TYPE: .COB
HOST:
SUBSYSTEM: CDM
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41200

DESCRIPTION:

PERFORM SQL INSERT STATEMENT TO INSERT A SINGLE TUPLE INTO THE
GENERATED AP TABLE.

ARGUMENTS:

GENERATED-MOD-ID - DSPLY [X(10)]
USER-MOD-ID - DSPLY [X(10)]
GENERATED-BY - DSPLY [X(10)]
DB-ID - DSPLY [S9(9)]
MOD-TYPE - DSPLY [X(10)]
CASE-NO - DSPLY [S9(9)]
IS-ACTION - DSPLY [X]
ORACLE-LDA - RECRD
RET-STATUS - DSPLY [X(5)]

INCLUDE FILES:

ERRCDM - IISS ERROR STATUS CODES FOR CDMP MODULES
CHKCDM - IISS CDMP CHECK STATUS CODES
ORCLEDA - WS DEFINITION FOR THE ORACLE LOGIN AREA
ERRPRO - PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

OOPEN
OSQL3
OBINDN
OEXEC
OCLOSE
ERRPRO

CALLED DIRECTLY BY:

CDECHK - PROVIDE PRECOMPILER ERROR CHECKING

USED IN MAIN PROGRAM(S):

MAIN - PROGRAM NAME NDML MAIN AND UI

PRECOMPILER CONTROL Module Documentation

NAME: CDM01
PURPOSE: CONTROLS ALL REQUESTS FOR MODULE NAMES
LANGUAGE: VAX-11 COBOL
MODULE TYPE: PROGRAM
SOURCE FILE: CDM01
SOURCE FILE TYPE: .COB
HOST:
SUBSYSTEM: CDM
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41200

DESCRIPTION:

-
THIS ROUTINE IS A MAIN PROGRAM Q-SERVER.
IT WILL HANDLE 4 TYPES OF REQUESTS:
QO - PROVIDE A NEW UNUSED NAME FOR A SOFTWARE MODULE.
PD - PROVIDE A NAME FOR A SOFTWARE MODULE FROM A LIST
OF PREDETERMINED NAMES.
RM - MARK A SINGLE MODULE NAMEAS AVAILABLE FOR REUSE
RA - MARK ALL NAMES ASSOCIATED WITH A USER MODULE NAME
(THROUGH PREVIOUSLY BEING GENERATED) AS BEING AVAILABLE
FOR REUSE.

NOTE LIMITATIONS SECTION!!

INCLUDE FILES:

CHKCDM	- IISS CDMP CHECK STATUS CODES
ERRCDM	- IISS ERROR STATUS CODES FOR CDMP MODULES
SRVRET	- AS THE RETURN GIVEN A TABLE-FULL ERROR
ORCLEDA	- WS DEFINITION FOR THE ORACLE LOGIN AREA
ALFABET	- LETTERS CONTAINED IN THE ENGLISH ALPHABET
ERRPRO	- PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

TRMNAT

```
INITAL
OLON
OLOGOF
OOPEN
OCLOSE
OSQL3
ODFINN
RCV
OEXEC
OFETCH
OBINDN
OCOM
QSEND
ERRPRO
```

PRECOMPILER CONTROL Module Documentation

NAME: CDP13
PURPOSE: CONTROLS REQUEST PROCESSOR CODE GENERATION
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: CDP13
SOURCE FILE TYPE: .COB
HOST:
SUBSYSTEM: CDM
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41200

DESCRIPTION:

- CDP13 IS CALLED FOR EACH CONCEPTUAL TRANSACTION AFTER THE CS-IS TRANSFORM DONE BY CDPRE6 IS COMPLETE.
IT PROCESSES THE SUBTRANSACTIONS IDENTIFIED BY THE CS TO IS DECOMPOSER, DETERMINING WHICH DBMS EACH SUBTRANS APPLIES TO, AND TAKING THE APPROPRIATE ACTION FOR EACH.

ARGUMENTS:

SUBTRANS-PROCESS-ID-TABLE = RECRD
IS-ACTION-LIST = RECRD
IS-QUALIFY-LIST = RECRD
ES-ACTION-LIST = RECRD
ES-QUALIFY-LIST = RECRD
CS-ACTION-LIST = RECRD
CE-WORK-LIST = RECRD
UV-ABBR-LIST = RECRD
CS-QUALIFY-LIST = RECRD
JQG = RECRD
JQG-ATTRIBUTE-PAIR-LIST = RECRD
SET-TABLE = RECRD
RFT = RECRD
MY-HOST = DSPLY [XXX]
TARGET-HOST = DSPLY [XXX]
ORACLE-LDA = RECRD
PARCL1 = DSPLY [X(30)]
PARCL2 = DSPLY [X(30)]

```
PARCL3 = DSPLY [X(30)]
PARCL4 = DSPLY [X(30)]
ERRFILE = DSPLY [X(30)]
SOURCE-LANGUAGE = DSPLY [X(10)]
IOSECTION-INDICATOR = DSPLY [9]
CODE-GENERATOR-TABLE = RECRD
RET-STATUS = DSPLY [X(5)]
```

INCLUDE FILES:

CHKCDM	- IISS CDMP CHECK STATUS CODES
ERRCDM	- IISS ERROR STATUS CODES FOR CDMP MODULES
APAT	- ACCESS PATH TABLE
APINFO	- ACCESS PATH INFORMATION TABLE
APRK	- TABLE OF RECORD KEYS FOR CODASYL ACCESS PATHS
APGC	- GENERIC CODASYL COMMAND TABLE
SUBPROC	- SUBTRANSACTION PROCESSES ID TABLE
ISAL	- INTERNAL SCHEMA ACTION LIST
ISQUAL	- INTERNAL SCHEMA QUALIFY LIST
CSQUAL	- CONCEPTUAL SCHEMA QUALIFY LIST
JQGTBL	- JOIN QUERY GRAPH TELLS HOW TO CONNECT SUBTRANSACTIONS
APL	- JOIN QUERY ATTRIBUTE PAIR LIST
SETTAB	- LIST OF SETS OWNER-MEMBER RELATIONSHIPS
RFTABLE	- THE RESULT FIELD TABLE
ESAL	- EXTERNAL SCHEMA ACTION LIST
ESQUAL	- EXTERNAL SCHEMA QUALIFY LIST
CEWORK	- CS TO ES WORK LIST INFORMATION
UVABBR	- USER VIEW ABBREVIATION LIST
CSAL	- CONCEPTUAL SCHEMA ACTION LIST
CGTABLE	- CODE GENERATING TABLE- TRACKS ALL GENERATED SOFTWARE
ORCLEDA	- WS DEFINITION FOR THE ORACLE LOGIN AREA
ERRPRO	- PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

APNAME	- INTERFACES WITH THE MODULE NAME QUEUE SERVER
CDPRE8	
CDP10	
RPTERR	- OUTPUT PRECOMPILER ERROR MESSAGES TO AP LISTING
CDQPO	
CDQPC	
CDQPT	
CDPRE7	

CDPRE9
ERRPRO

PRECOMPILER CONTROL Module Documentation

```
NAME:                    CDPRE
PURPOSE:                 CDPRE   MAIN ENTRY POINT FOR THE NDML
                         PRECOMPILER
LANGUAGE:                VAX-11 COBOL
MODULE TYPE:             SUBROUTINE
SOURCE FILE:             CDPRE
SOURCE FILE TYPE:        .COB
HOST:
SUBSYSTEM:               CDM
SUBDIRECTORY:
DOCUMENTATION GROUP:     PS41200

DESCRIPTION:
------------
  - THIS IS THE MAIN ENTRY POINT FOR THE NDML PRECOMPILER
  ON INPUT THE USER INTERFACE HAS BEEN PERFORMED. IT
  CALLS CDPRE1 TO BREAK APART THE USER'S
  SOFTWARE MODULE INTO THE FOUR PARCELS, THEN CALLS
  -


ARGUMENTS:
----------
  AP-FILE-IN = DSPLY [X(30)]
  ERROR-FILE = DSPLY [X(30)]
  AP-TARGET-HOST = DSPLY [XXX]
  USER-AP-NAME = DSPLY [X(10)]
  CODE-GENERATOR-TABLE = RECRD
  GOOD-PRECOMPILES = DSPLY [S9(9)]
  BAD-PRECOMPILES = DSPLY [S9(9)]
  RET-STATUS = DSPLY [X(5)]


INCLUDE FILES:
--------------
  ORCLEDA     - WS DEFINITION FOR THE ORACLE LOGIN AREA
  SRVRET      - AS THE RETURN GIVEN A TABLE-FULL ERROR
  CHKCDM      - IISS CDMP CHECK STATUS CODES
  ERRCDM      - IISS ERROR STATUS CODES FOR CDMP MODULES
  CGTABLE     - CODE GENERATING TABLE- TRACKS ALL GENERATED
                SOFTWARE
  ERRPRO      - PROCESS ERROR INCLUDE FILE
```

ROUTINES CALLED:

OLON	
OPNINPT	
RPTERR	- OUTPUT PRECOMPILER ERROR MESSAGES TO AP LISTING
CDPRE1	
CDPRE2	
CDP12	
CDP14	
OCOM	
OLOGOF	
ERRPRO	
OROL	
CDECHK	- PROVIDE PRECOMPILER ERROR CHECKING
OPNERR	
WRITERR	
REDINPT	
UNPLINE	
CLSERR	

CALLED DIRECTLY BY:

MAIN	- PROGRAM NAME	NDML MAIN AND UI

USED IN MAIN PROGRAM(S):

MAIN	- PROGRAM NAME	NDML MAIN AND UI

PRECOMPILER CONTROL Module Documentation

NAME: MAIN
PURPOSE: PROGRAM NAME NDML MAIN AND UI
LANGUAGE: VAX-11 COBOL
MODULE TYPE: PROGRAM
SOURCE FILE: MAIN

DESCRIPTION:

INCLUDE FILES:

- FILSTAT - VARIABLE DEFINITION FOR FILE STATUS
- ERRCDM - IISS ERROR STATUS CODES FOR CDMP MODULES
- CHKCDM - IISS CDMP CHECK STATUS CODES
- SRVRET - AS THE RETURN GIVEN A TABLE-FULL ERROR
- CGTABLE - CODE GENERATING TABLE- TRACKS ALL GENERATED SOFTWARE
- ERRPRO - PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

- CDPRE - CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER
- TRMNAT
- ERRPRO
- INITEX

PRECOMPILER CONTROL Module Documentation

```
NAME:                   OPNFIL
PURPOSE:                THIS ROUTINE OPENS AN OUTPUT FILE.
LANGUAGE:               C
MODULE TYPE:            FUNCTION
FUNCTION TYPE:          INT ()
SOURCE FILE:            OPNFIL
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              CDM
SUBDIRECTORY:
DOCUMENTATION GROUP:    PS41200

DESCRIPTION:
------------
   SYNOPSIS
        C          --   OPNFIL(@FILE_NAME) ;

        COBOL      --   CALL "OPNFIL"  USING
                                       FILE-NAME.

        FORTRAN    --   CALL OPNFIL(FILENAME)


   INPUT:
        CHAR *FILE_NAME ;

   OUTPUT:


   DESCRPIPTION:
  THE FILE WILL  CONTAINS THE USER'S NDDL.

ARGUMENTS:
----------
  FILE_NAME -       CHAR *


INCLUDE FILES:
--------------
  STDIO       - **** PURPOSE NOT FOUND BY STRIPPER ****


ROUTINES CALLED:
```

FOPEN
PRINTF

PRECOMPILER CONTROL Module Documentation

NAME: RCMOD
PURPOSE: MARK PREVIOUSLY ASSIGNED MODULES AS REUSABLE
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: RCMOD
SOURCE FILE TYPE: .COB
HOST:
SUBSYSTEM: CDM
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41200

DESCRIPTION:

THIS ROUTINE MUST BE USED TO MARK ALL PREVIOUSLY ASSIGNED MODULES GENERATED FOR THE USER MODULE NAME AS REUSEABLE. IT EXPECTS THE NAME OF A USER MODULE.

ARGUMENTS:

USER-MOD-NAME = DSPLY [X(10)]
RET-STATUS = DSPLY [X(5)]

INCLUDE FILES:

SRVRET - AS THE RETURN GIVEN A TABLE-FULL ERROR
ERRCDM - IISS ERROR STATUS CODES FOR CDMP MODULES
CHKCDM - IISS CDMP CHECK STATUS CODES
ERRPRO - PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

CDFUNC
NSEND
RCV
ERRPRO

CALLED DIRECTLY BY:

CDECHK - PROVIDE PRECOMPILER ERROR CHECKING

USED IN MAIN PROGRAM(S):

MAIN	- PROGRAM NAME	NDML MAIN AND UI

PRECOMPILER CONTROL Module Documentation

NAME: RPTERR
PURPOSE: OUTPUT PRECOMPILER ERROR MESSAGES TO AP LISTING
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: RPTERR
SOURCE FILE TYPE: .COB
HOST:
SUBSYSTEM: CDM
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41200

DESCRIPTION:

-

THIS PROGRAM OUTPUTS ERROR MESSAGES TO AP LISTING FROM PRECOMPILER-ENCOUNTERED ERRORS. THIS ROUTINE SIMPLY OPENS THE LISTING AT END, WRITES THE MESSAGE AND CLOSES THE LISTING.

ARGUMENTS:

FNAME = DSPLY [X(30)]
ERRMESS = DSPLY [X(60)]

INCLUDE FILES:

FILSTAT - VARIABLE DEFINITION FOR FILE STATUS
ERRPRO - PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

ERRPRO

CALLED DIRECTLY BY:

CDP13 - CONTROLS REQUEST PROCESSOR CODE GENERATION

CDPRE - CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER

USED IN MAIN PROGRAM(S):

CDP13 - CONTROLS REQUEST PROCESSOR CODE GENERATION
MAIN - PROGRAM NAME NDML MAIN AND UI

PRECOMPILER CONTROL Module Documentation

NAME: RUNOD
PURPOSE: SIGNAL REUSE OF A MODULE
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: RUNOD
SOURCE FILE TYPE: .COB
HOST:
SUBSYSTEM: CDM
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41200

DESCRIPTION:

THIS ROUTINE MUST BE USED TO MARK A SINGLE MODULE NAME AS AVAILABLE FOR REUSE. IT WILL SEND A MESSAGE TO THE MODULE NAME Q-SERVER.

ARGUMENTS:

DBMS-NAME - DSPLY [X(10)]
AP-NAME - DSPLY [X(10)]
RET-STATUS - DSPLY [X(5)]

INCLUDE FILES:

SRVRET - AS THE RETURN GIVEN A TABLE-FULL ERROR
ERRCDM - IISS ERROR STATUS CODES FOR CDMP MODULES
CHKCDM - IISS CDMP CHECK STATUS CODES
ERRPRO - PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

CDFUNC
NSEND
ERRPRO

CALLED DIRECTLY BY:

CDECHK - PROVIDE PRECOMPILER ERROR CHECKING

USED IN MAIN PROGRAM(S):

MAIN	- PROGRAM NAME	NDML MAIN AND UI

PRECOMPILER CONTROL Module Documentation

NAME: STRMOV
PURPOSE: MOVE THE STRING TO THE POOL
LANGUAGE: VAX-11 FORTRAN
MODULE TYPE: SUBROUTINE
SOURCE FILE: STRMOV
SOURCE FILE TYPE: .FOR
HOST:
SUBSYSTEM: CDM
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41200

DESCRIPTION:

ARGUMENTS:

STRING = CHAR
POOL = CHAR
SIZE = I*4
BCHAR = I*4

PRECOMPILER CONTROL Module Documentation

NAME: SUBMOV
PURPOSE: FACILITATE A SUB-STRING MOVE
LANGUAGE: VAX-11 FORTRAN
MODULE TYPE: SUBROUTINE
SOURCE FILE: SUBMOV
SOURCE FILE TYPE: .FOR
HOST:
SUBSYSTEM: CDM
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41200

DESCRIPTION:

ARGUMENTS:

CLAUS - CHAR
SUBSTR - CHAR
BCHAR - I*4
BCHAR - I*4

3.10.9 Include File Descriptions

The following list contains a purpose and description of each include file listed in 3.10.4 as specified in the source code. The language it is written in is also given.

PRECOMPILER CONTROL Include File Description

FILE NAME: ALFABET
PURPOSE: LETTERS CONTAINED IN THE ENGLISH ALPHABET
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

THIS IS THE ENGLISH ALPHABET. THE LETTERS ARE USED
FOR ASSIGNING THE NEXT UNIQUE NAME WHEN THE
NUMBERS RUN OUT.

ALFABET.INC

PRECOMPILER CONTROL Include File Description

FILE NAME: APAT
PURPOSE: ACCESS PATH TABLE
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

CONTAINS THE ACCESS PATH FOR ONE SUBTRANSACTION
FOR A NDML REQUEST.

PRECOMPILER CONTROL Include File Description

FILE NAME: APGC
PURPOSE: GENERIC CODASYL COMMAND TABLE
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

HOLDS THE GENERIC CODASYL DML COMMANDS FOR AN ACCESS PATH OF A NDML REQUEST

PRECOMPILER CONTROL Include File Description

FILE NAME: APINFO
PURPOSE: ACCESS PATH INFORMATION TABLE
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

THIS IS A COLLECTION OF INFORMATION STORED IN A
NUMBER OF VARIOUS TABLES USED BY THE ACCESS PATH TABLE
AND THE GENERIC CODASYL TABLE. SEE CDMP SPEC, PRE6

APINFO.INC

PRECOMPILER CONTROL Include File Description

FILE NAME: APL
PURPOSE: JOIN QUERY ATTRIBUTE PAIR LIST
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

CONTAINS INFORMATION ABOUT THE JOIN
ATTRIBUTES FOR NDML SUBTRANSACTIONS

PRECOMPILER CONTROL Include File Description

FILE NAME: APRK
PURPOSE: TABLE OF RECORD KEYS FOR CODASYL ACCESS PATHS
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

CONTAINS INFORMATION FOR THE KEYS OF
RECORDS CONTAINED IN THE CURRENT ACCESS
PATH

PRECOMPILER CONTROL Include File Description

FILE NAME: CEWORK
PURPOSE: CS TO ES WORK LIST INFORMATION
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

PRECOMPILER CONTROL Include File Description

FILE NAME CGTABLE
PURPOSE CODE GENERATING TABLE- TRACKS ALL GENERATED SOFTWARE
LANGUAGE VAX-11 COBOL

DESCRIPTION

CODE GENERATOR TABLE HOLDS PERTINENT RESULTS
ABOUT ALL CODE GENERATED OR MODIFIED BY THE
PRECOMPILER
NOTE NOW 100 RESERVED FOR SWAPPING DURING SORTING.

PRECOMPILER CONTROL Include File Description

FILE NAME: CHKCDM
PURPOSE: IISS CDMP CHECK STATUS CODES
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

CONTAINS ALL STATUS CODES FOR THE
CDMP MODULES

PRECOMPILER CONTROL Include File Description

FILE NAME: CSAL
PURPOSE: CONCEPTUAL SCHEMA ACTION LIST
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

TABLE TO HOLD CONCEPTUAL DATA ABOUT THE REQUEST

***** THE CONCEPTUAL SCHEMA ACTION LIST

PRECOMPILER CONTROL Include File Description

FILE NAME: CSQUAL
PURPOSE: CONCEPTUAL SCHEMA QUALIFY LIST
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

CONTAINS CONCEPTUAL SCHEMA INFORMATION FOR
THE REQUESTS QUALIFICATION

THE CONCEPTUAL SCHEMA QUALIFY LIST

PRECOMPILER CONTROL Include File Description

FILE NAME: ERRCDM
PURPOSE: IISS ERROR STATUS CODES FOR CDMP MODULES
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

CONTAINS ALL ERROR CODES USED BY CDMP *
MODULES FOR ERROR HANDLING *

PRECOMPILER CONTROL Include File Description

FILE NAME: ERRPRO
PURPOSE: PROCESS ERROR INCLUDE FILE
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

PRECOMPILER CONTROL Include File Description

FILE NAME: ESAL
PURPOSE: EXTERNAL SCHEMA ACTION LIST
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

CONTAINS THE EXTERNAL SCHEMA INFORMATION FOR AN NDML REQUEST

THE EXTERNAL SCHEMA ACTION LIST

PRECOMPILER CONTROL Include File Description

FILE NAME: ESQUAL
PURPOSE: EXTERNAL SCHEMA QUALIFY LIST
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

CONTAINS EXTERNAL SCHEMA INFORMATION FOR THE NDML QUALIFICATION

THE EXTERNAL SCHEMA QUALIFY LIST

PRECOMPILER CONTROL Include File Description

FILE NAME: FILSTAT
PURPOSE: VARIABLE DEFINITION FOR FILE STATUS
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

FILE USAGE FILE STATUS PARAMETER

```
FILSTAT
      FILE USAGE FILE STATUS PARAMETER
        SIZE AND THE 88 VALUE ARE PROBABLY MACHINE
              DEPENDENT
(THIS IS FOR VAX-11 COBOL)
```

PRECOMPILER CONTROL Include File Description

FILE NAME: ISAL
PURPOSE: INTERNAL SCHEMA ACTION LIST
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

CONTAINS INTERNAL SCHEMA INFORMATION ABOUT AN NDML REQUEST

THE INTERNAL SCHEMA ACTION LIST

PRECOMPILER CONTROL Include File Description

FILE NAME: ISQUAL
PURPOSE: INTERNAL SCHEMA QUALIFY LIST
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

CONTAINS INTERNAL SCHEMA INFORMATION FOR AN
NDML QULIFICATION

THE INTERNAL SCHEMA QUALIFY LIST

PRECOMPILER CONTROL Include File Description

FILE NAME: JQGTBL
PURPOSE: JOIN QUERY GRAPH TELLS HOW TO CONNECT SUBTRANSACTIONS
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

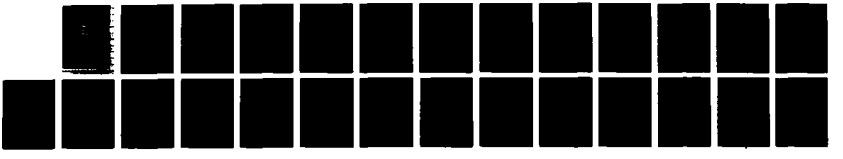
PRECOMPILER CONTROL Include File Description

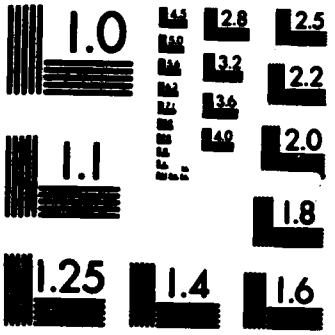
FILE NAME: ORCLEDA
PURPOSE: WS DEFINITION FOR THE ORACLE LOGIN AREA
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

THE ORACLE LOGON DATA AREA

AD-A101 957 INTEGRATED INFORMATION SUPPORT SYSTEM (IISS) VOLUME 5 2/2
COMMON DATA MODEL S..(U) GENERAL ELECTRIC CO
SCHENECTADY NY PRODUCTION RESOURCES CONSU..
UNCLASSIFIED J L ALTHOFF ET AL. 01 NOV 85 PS-620141200 F/G 12/5 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

PRECOMPILER CONTROL Include File Description

FILE NAME: RFTABLE
PURPOSE: THE RESULT FIELD TABLE
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

CONTAINS CONCEPTUAL SCHEMA INFORMATION ABOUT
THE RESULTS OF AN NDML REQUEST

THE RESULT FIELD TABLE

WHEN CHANGING THE STRUCTURE OF THIS TABLE
BE SURE TO CHANGE THE LAYOUT IN THE

PRECOMPILER CONTROL Include File Description

FILE NAME: SETTAB
PURPOSE: LIST OF SETS OWNER-MEMBER RELATIONSHIPS
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

SET TABLE TO KEEP TRACK OF CODASYL NDML REQUESTS
IN TERMS OF OWNER AND MEMBER RELATIONSHIPS

PRECOMPILER CONTROL Include File Description

FILE NAME: SRVRET
PURPOSE: AS THE RETURN GIVEN A TABLE-FULL ERROR
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

```
   MODIFIED 11/2/83 TO INCLUDE RET-CODE-5                          *
   MODIFIED 1/9/84 TO INCREASE ALL ERROR CODES TO PIC X(5)         *
     AND TO ELIMINATE ALPHA'S                                      *
   MODIFIED 1/26/84 TO ADD RET-CODE FOR GETUSR-NOT-SUCC            *
   SRV-SUCCESSFUL ADDED FOR GENERIC RETURN                         *
   MODIFIED 2/7/84 TO ADD ERROR CODES FOR ENTRY-NOT-FOUND          *
   MODIFIED 2/8/84 TO ADD WHTHST-NOT-SUCCESSFUL                    *
   MODIFIED 2/20/84 TO ADD TSTMOD NEW CODES.                       *
      MODIFIED 20 AUG 84 INITALIZE ALL LOCAL VARAIBLES TO
               SPACES OR 0.
   MODIFIED 5/21/85 TO ADD RCL AND FILGEN RETURN CODES
```

PRECOMPILER CONTROL Include File Description

FILE NAME: SUBPROC
PURPOSE: SUBTRANSACTION PROCESSES ID TABLE
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

THIS TABLE MUST HAVE THE SAME NUMBER OF OCCURS AS THE RITABLE.INC SINCE THEY ARE PARALLEL TABLES.

PRECOMPILER CONTROL Include File Description

FILE NAME: UVABBR
PURPOSE: USER VIEW ABBREVIATION LIST
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

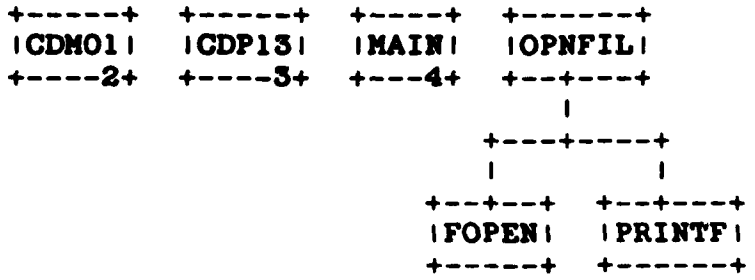
CONTAINS THE ABBREVIATIONS FOR ALL USER
VIEW REFERENCED IN THE NDML REQUEST

3.10.10 Hierarchy Chart

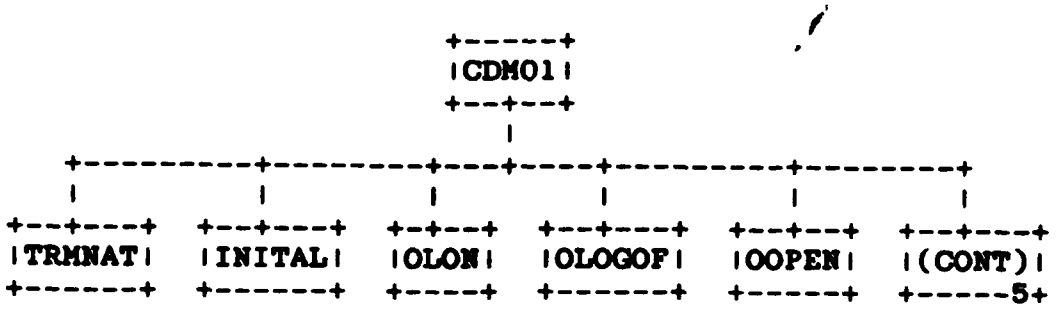
The following hierarchy charts show the relationships between all of the modules mentioned in the above documentation. A module may call a subroutine several times within its code, but the call will only be shown once as a single relationship on this hierarchy chart. All modules shown at the top of the first page are considered Main Programs as described in section 3.10.1 above.

There is an internal paging scheme as marked by the numbers in the upper right corner of each page. An index after the last page of the chart shows where a routine and its calls are first defined. If a routine has no page reference, it either makes no calls or is an external routine. A continuation box on the end of a tree limb shows where that the tree continues on the page numbered mentioned. A number in a box with a routine name points to the page where the routine is further defined within the hierarchy tree. If there is no number in a box, the routine either makes no calls or is an external routine.

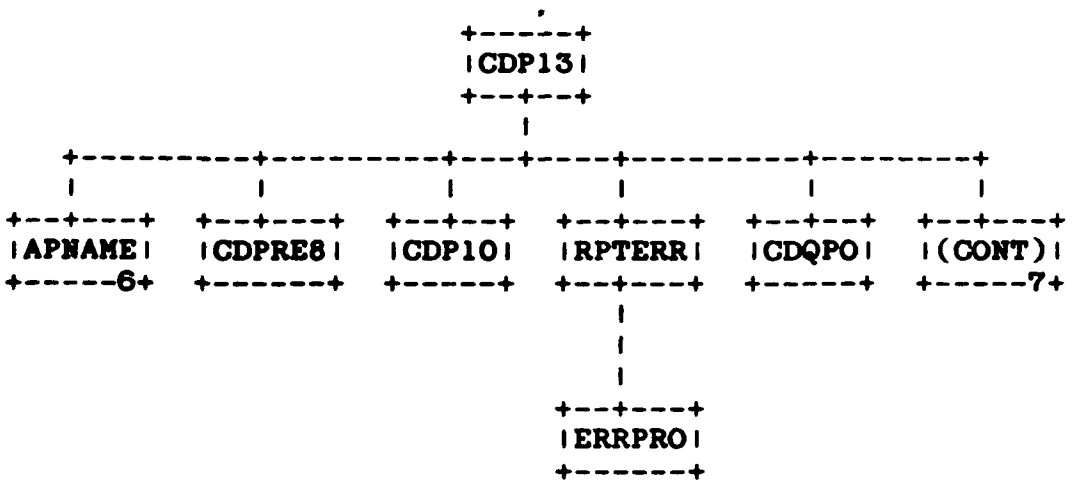
1



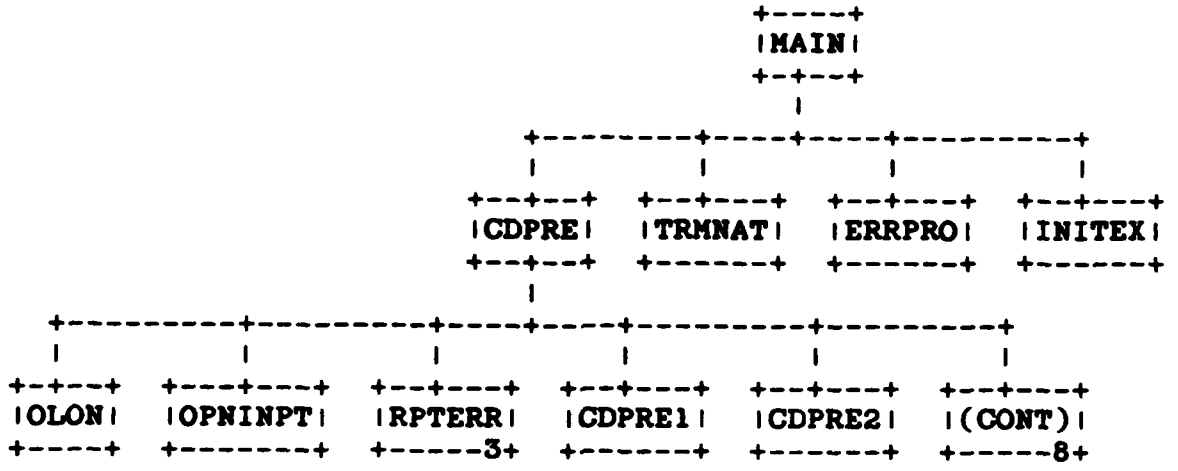
2



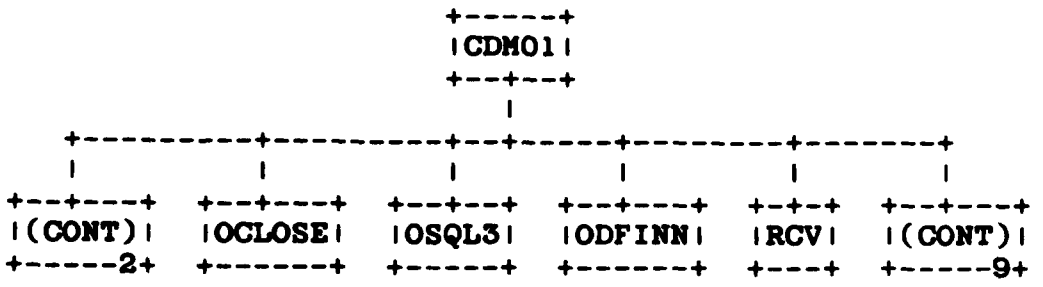
3

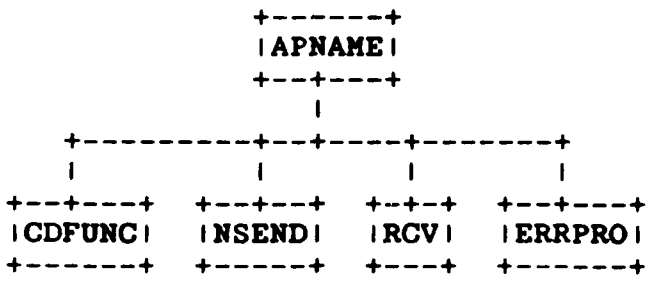


4

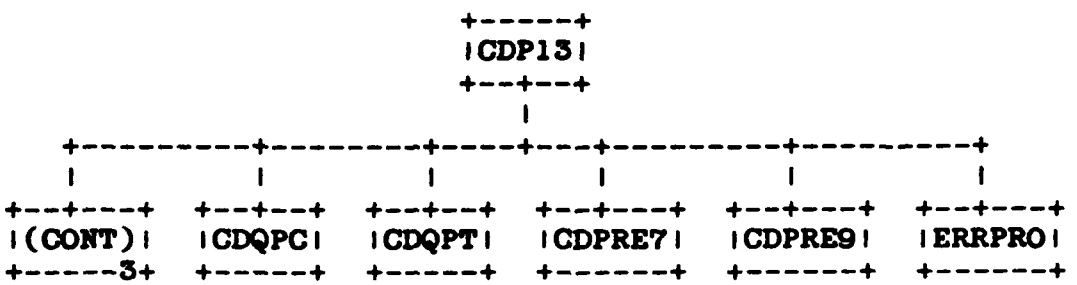

MAIN
CDPRE
TRMNAT
ERRPRO
INITEX
OLON
OPNINPT
RPTERR
3
CDPRE1
CDPRE2
(CONT)
8

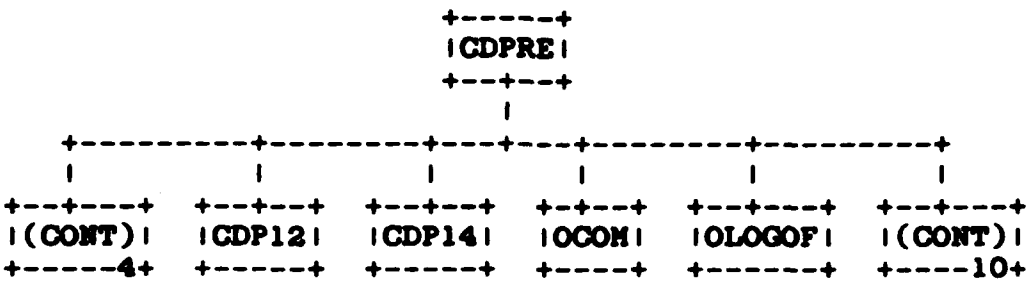
5



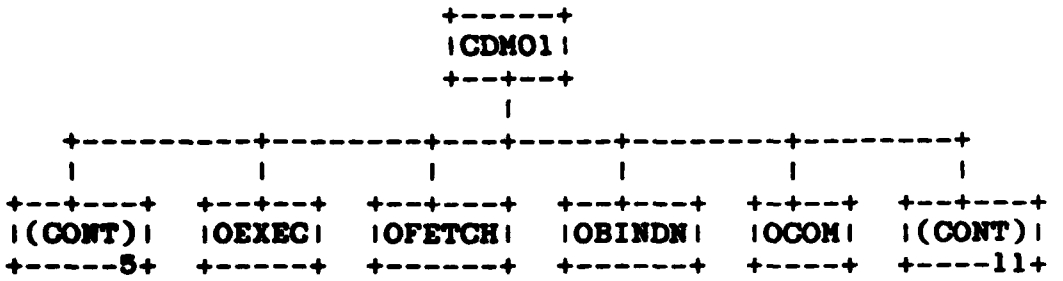

APNAME
CDFUNC
NSEND
RCV
ERRPRO

7

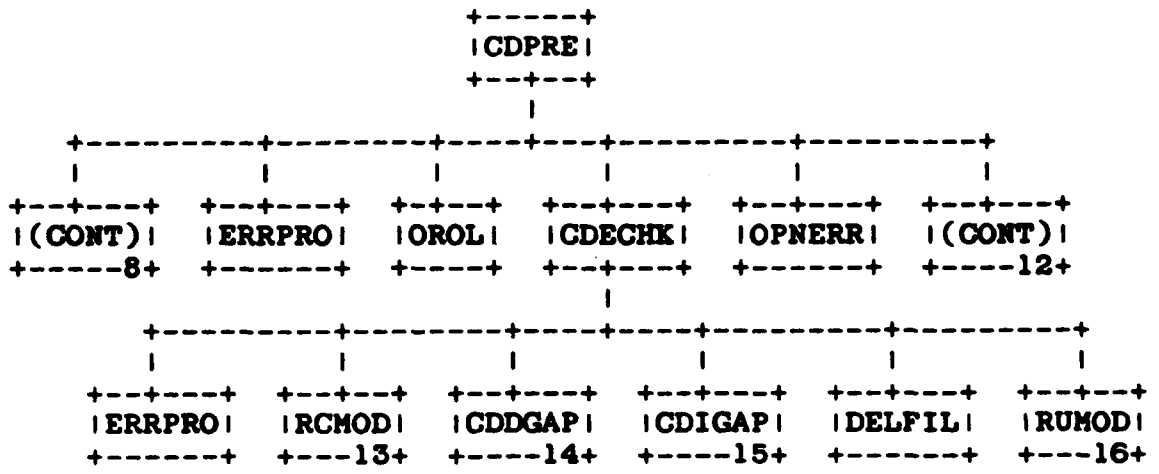



CDPRE
(CONT)
CDP12
CDP14
OCOM
OLOGOF
(CONT)
4
10

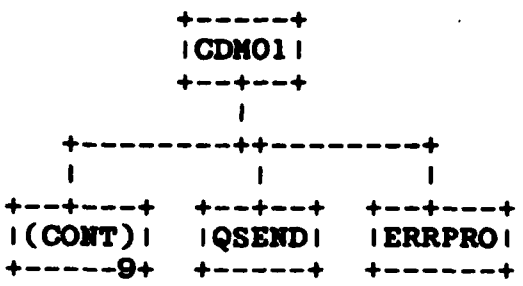
9

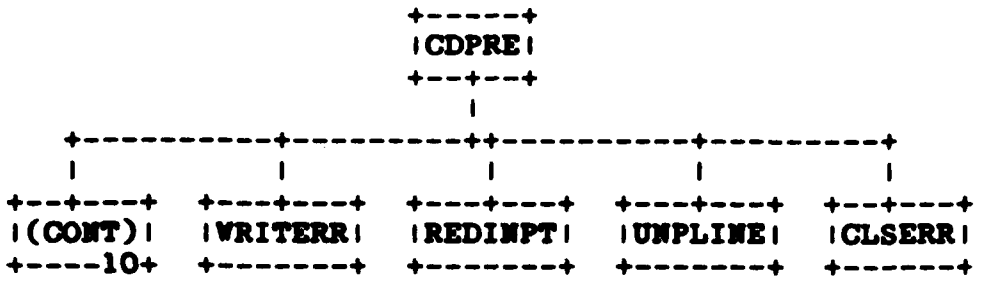


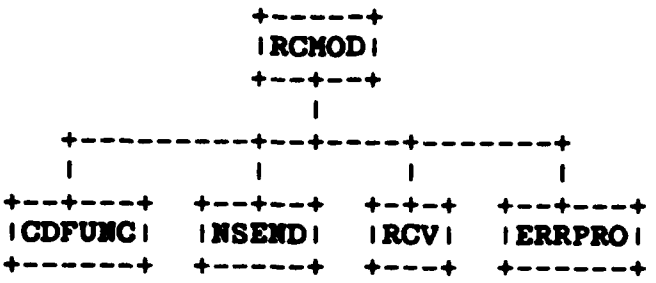
10

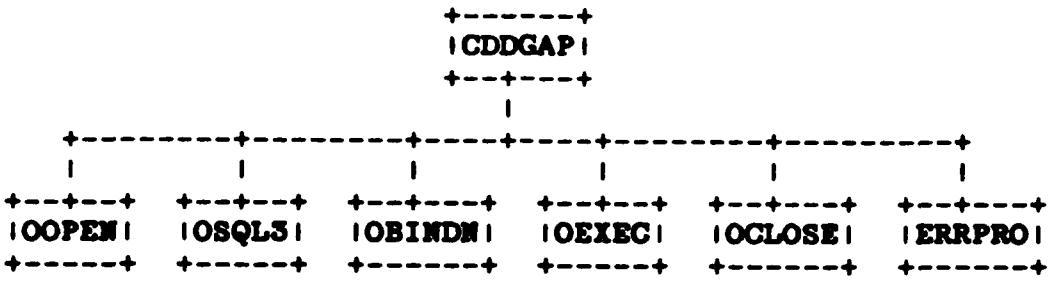

CDPRE
(CONT)
8
ERRPRO
OROL
CDECHK
OPNERR
(CONT)
12
ERRPRO
RCMOD
13
CDDGAP
14
CDIGAP
15
DELFIL
RUMOD
16

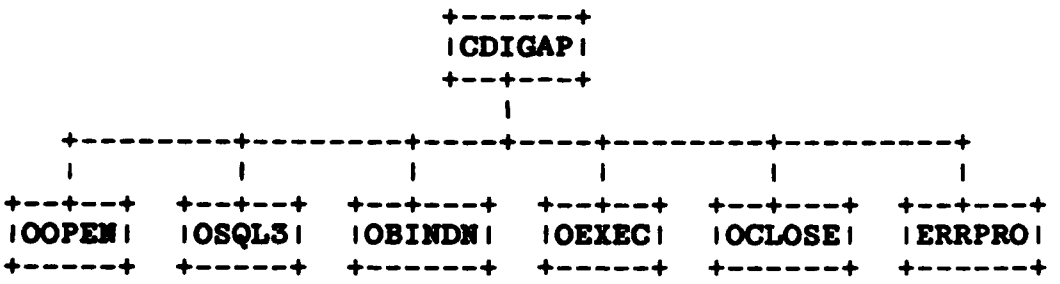
11

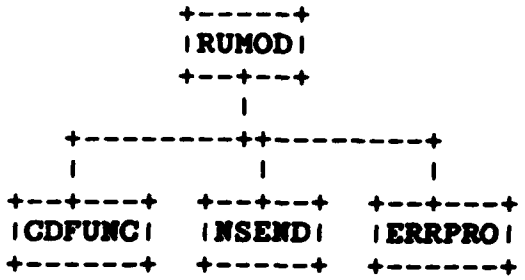



CDPRE
(CONT)
10
WRITERR
REDINPT
UNPLINE
CLSERR


RCMOD
CDFUNC
NSEND
RCV
ERRPRO


CDDGAP
OOPEN
OSQL3
OBINDN
OEXEC
OCLOSE
ERRPRO


CDIGAP
OOPEN
OSQL3
OBINDN
OEXEC
OCLOSE
ERRPRO


RUMOD
CDFUNC
NSEND
ERRPRO

3.11 Program Listings Comments

This information is contained in the Module Descriptions in section 3.10.

SECTION 4

QUALITY ASSURANCE PROVISIONS

4.1 Introduction and Definitions

"Testing" is a systematic process that may be preplanned and explicitly stated. Test techniques and procedures may be defined in advance, and a sequence of test steps may be specified. "Debugging" is the process of isolation and correction of the cause of an error.

"Antibugging" is defined as the philosophy of writing programs in such a way as to make bugs less likely to occur and when they do occur, to make them more noticeable to the programmer and the user. In other words, as much error checking as is practical and possible in each routine should be performed.

4.2 Computer Programming Test and Evaluation

The quality assurance provisions for test consists of the normal testing techniques that are accomplished during the construction process. They consist of design and code walk-throughs, unit testing, and integration testing. These tests are performed by the design team. Structured design, design walk-through and the incorporation of "antibugging" facilitate this testing by exposing and addressing problem areas before they become coded "bugs."

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END

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